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## ENERGY AND SUSTAINABILITY 2017

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### OVERVIEW

The seventh International Conference on Energy and Sustainability was held in Seville, Spain, organised by Wessex Institute, UK and the University of Seville, Spain.

This very successful conference series started in the New Forest, UK, home of the Wessex Institute, in 2007; followed by meetings in Bologna (2009); Alicante (2011); Budapest (2013); Kuala Lumpur (2014); and Medellin, Colombia (2016).

Seville was a very suitable location for this meeting as this city has been the place for policies related to sustainability for many years. Specifically in the year 1992, when a Universal Exhibition was held in Seville, many measures were taken to make the location of the exhibition as sustainable as possible.

The city is almost 2200 years old and has a distinct personality and a large and well-preserved historical centre. The old town contains three world heritage sites: the Minaret of La Giralda, the General Archives of the Indies and the Alcazar Palace. The city is also home to many convents, churches, palaces, museums and public gardens.

The world's economy is fuelled by energy. Depletion of resources and severe environmental effects resulting from the continuous use of fossil fuels has motivated an increasing amount of interest in renewable energy resources and the search for sustainable energy policies.

The changes required to progress from an economy mainly focussed on hydrocarbons to one taking advantage of sustainable energy resources require considerable scientific research, as well as the development of new engineering systems. Energy policies and management are of primary importance to achieve the development of sustainability and need to be consistent with recent advances in energy production and distribution.

In many cases, the challenges lie as much in the conversion from renewable energies (wind, solar etc) to useful forms (electricity, heat, fuel) at an acceptable cost (including damage to the environment) as in the integration of these resources into an existing infrastructure.

### OPENING THE CONFERENCE

The conference was opened by Santiago Hernández, member of the Board of Directors of the Wessex Institute. On behalf of Professor Carlos A. Brebbia he welcomed the delegates, explained the objectives of the meeting and mentioned that the quality of the papers accepted was a promise of a brilliant event. Then he gave a presentation of the Wessex Institute detailing the broad range of activities that include research projects on different topics, publication of journals on several scientific and social fields, and the large experience in the organisation of international conferences. These conferences contribute very efficiently in bringing together relevant specialists from academia and industry that present the most up to date achievements for the benefit of the delegates.

All papers are archived in the eLibrary of the Institute ([www.witpress.com/elibrary](http://www.witpress.com/elibrary)) where they are easily accessible to the international community.

WIT originated from a research group from the University of Southampton and it is considered the creator of the boundary elements method, a numerical technique initially devoted to engineering analysis but due to the enhancements produced by the Institute can be used nowadays for a vast range of practical applications.

Santiago also explained that WIT welcomes postdoctoral researchers who can spend an academic year in the Institute working on their projects and benefiting from the excellent facilities and the peaceful and beautiful surroundings of the Institute.

## PRIGOGINE MEDAL

A special event took place during the conference, the award of the 2017 Prigogine Medal.

The ceremony was opened by the Chancellor of the University of Seville, Professor Miguel A. Castro, and then the Director of the School of Architecture, Professor Francisco Montero, welcomed the delegates and expressed their satisfaction at having been chosen to hold such a prestigious event. Afterwards, Professor Santiago Hernández, Chairman of the conference, on behalf of Professor Carlos A. Brebbia, Director of WIT, explained that the Prigogine Medal honours the memory of the late Professor Ilya Prigogine, winner of the Nobel Prize for Chemistry. It was established in the year 2004 by the University of Siena and the Wessex Institute and is given annually to a renowned scientist in the field of ecological systems.

Ilya Prigogine was born in Moscow in 1917, and obtained his undergraduate and graduate education in Chemistry at the Free University in Brussels.

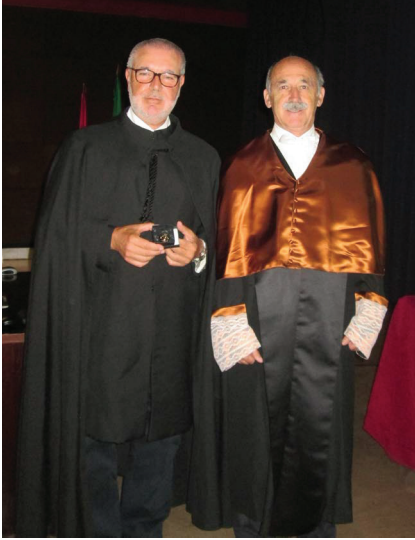
He was awarded the Nobel Prize for his contribution to non-equilibrium thermodynamics, particularly the theory of dissipative structures. The main theme of his scientific work was the role of time in the physical sciences and biology. He contributed significantly to the understanding of irreversible processes, particularly in systems far from equilibrium. The results of his work have had profound consequences for understanding biological and ecological systems.

Prigogine's ideas established the basis of ecological systems research. The Prigogine medal to honour his memory is awarded annually to a leading scientist in the field of ecological systems. All recipients have been deeply influenced by Prigogine's work.

The recipient of the 2017 Award was Professor João Carlos Marques from the University of Coimbra, Portugal who studied at the University of Lisbon, where he received a graduate degree in biology in 1980.

From early on, he was intrigued by scientific research, particularly in the field of marine biology and ecology, and thus pursued his academic studies, earning a PhD in ecology from the University of Coimbra in 1989, where subsequently he became Assistant Professor. Pursuing his academic career, he came to be Full Professor in 2004.

Marine and estuarine ecology has since then been his core area of research, and he soon developed an interest in aquatic ecosystems in general, as well as on their interface with



Prigogine Award

terrestrial ecosystems, always focusing on the study of ecological processes and their characterisation, quantification and modelling. Data and concepts integration gradually led to a broader view of sustainability problems of both natural and human built systems, namely focusing on the ecosystems services approach and on the development and application of suitable ecological indicators of ecosystems health and performance.

Additionally, he played a key role in creating new research infrastructures at Portuguese national level, namely acting as general coordinator of a “Pilot network for integrated long-term observation and research on Coastal Systems and Hydrographical Basins”.

Such intensive scientific activity allowed him to develop a large network of international cooperation with top scientists and research institutions, which

is expressed in his scientific productivity.

Professor João Carlos Marques then delivered his inaugural address entitled “Coastal systems in transition: The game of possibilities for sustainability under global climate change”.

## CONFERENCE TOPICS

The conference sessions included a substantial number of papers with the following headings:

- Biomass and biofuels
- Energy and transport
- Green buildings
- Renewable energy resources
- Processing of oil and gas
- Smart grids
- Energy management
- Waste to energy
- Energy efficiency
- Case studies
- CO<sub>2</sub> capturing and management
- Energy storage

## INVITED PRESENTATIONS

The conference was enhanced by a series of invited papers by well-known colleagues, i.e,

- “Is dry reforming the solution to reduce natural gas carbon footprint?” **Jean-Michel Lavoie**, Université de Sherbrooke, Canada.
- “Carbon recycling as enabler for renewable hydrogen economy”, **Stefan Petters**, Carbotopia Syndicate, Austria.
- “Nuclear power can be the answer”, **Rockley Boothroyd**, Independent Consultant, Australia.
- “Pyrolysis behaviour of waste coconut shell and husk biomasses”, **Qingyue Wang**, Saitama University, Japan.
- “Increasing efficiency of the pyrolysis process by influencing the initiation of thermal decomposition of hydrocarbons”, **Elena Magaril**, Ural Federal University, Russia.
- “Fundamental investigation of the oil/water flow emulsion in the downhole by CFD simulation”, **Hussain Al-Kayiem**, Universiti Teknologi PETRONAS, Malaysia.
- “Feasibility of utilization of charcoal and ashes from biomass-energy processes in construction materials”, **Nancy Quaranta**, National Technological University, Argentina.
- “Technical aspects of upgrading composting to anaerobic digestion and post-composting”, **Marco Ragazzi**, University of Trento, Italy.



Delegates at the conference

## SPECIAL SESSION

**Dr Elena Cristina Rada** arranged a special session entitled “Environment and energy: connection and opportunities”, during which she gave her lecture on “Opportunities for the energy sector from unconventional environmental analyses and sensors”.

Other papers in this session included:

- “Criteria for environmental optimization of electrical and thermal energy in agrotourism”
- “Environmental advantages of treatment plants generating biomethane from food waste”

## CONFERENCE DINNER

The Conference Banquet took place at El Patio Sevillano, a place that combines a restaurant and a flamenco folklore show. Thus, the delegates, in addition to having a taste of the typical Andalusian gastronomy, enjoyed a performance with singers, guitar players and flamenco dancers. The quality of the show and the amusing atmosphere of the site helped to strengthen the links amongst the conference attendees.

## CLOSING THE CONFERENCE

The Conference was closed by Professor Santiago Hernández, a member of the WIT Board of Directors, and by Professor Samuel Dominguez, Vice-Director of the School of Architecture and of the University of Seville, representing the two organising institutions of the conference. They thanked the delegates for their contribution to the success of the meeting.

All papers presented at WIT conferences are archived in the digital library of the Institute ([www.witpress.com/elibrary](http://www.witpress.com/elibrary)) where they are available to the scientific community in Open Access format.

## CONFERENCE PROCEEDINGS

The proceedings of Energy and Sustainability 2017 – Energy and Sustainability VII, 280pp (Print ISBN: 978-1-78466-221-9; eISBN: 978-1-78466-222-6) are available from WIT Press. Orders can be placed on the WIT Press web site at [www.witpress.com](http://www.witpress.com) or by email: [marketing@witpress.com](mailto:marketing@witpress.com), telephone: +44 (0) 238 029 3223 or fax: +44 (0) 238 029 2853.